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## Radiation Case Strategic Analysis Tool

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### Summary

The LANL Radiation Case Production Planning Tool is an executive-level decision support tool for planning related to the demand and production of radiation cases. The spreadsheet-based tool includes decision factors for stockpile program demand combined with production and infrastructure planning at Y-12. The tool displays graphical comparisons of supply and demand under different scenarios. The tool is based on NNSA planning documents and process analyses from Y12.

### Background

Radiation cases are key components for nuclear weapons. Recent weapon life extension programs have reused radiation cases from existing weapons. New cases have not been produced for several decades. Future modernization programs, however, will require new production of radiation cases. The weapon design labs have also developed new technologies for processing materials and forming radiation cases. Y12 is re-establishing legacy processes for case production and planning for intermediate and long-term production. The intermediate and long-term plans include legacy production techniques, introduction of new technologies, and strategies for establishing sufficient capacity to meet demand. Long-term plans include a new processing facility. In addition, NNSA has a limited supply of the source material used to make radiation cases. There are several strategies to procure new material with varying time frames.

### Demand

Radiation case demand is derived from the stockpile modernization plan as specified in the NNSA Planning and Production Directive (P&PD), augmented by system-level production decisions. The tool is designed around Annex A from the P&PD and is structured to be easily updated to new versions of the P&PD. The initial version of the tool uses P&PD2021-1 as its basis. The tool allows variation of the production plan and specification of wrought or direct cast production for each future weapon system.

### Ingot and Case Production

The legacy process for case production involves alloying source material through a VIM-VAR-VAR process to produce ingots, wrought forming ingots into blanks, and then machining blanks to final specifications. Electric-beam cold hearth melting (CHM) for ingot production and direct cast forming of blanks are being developed independently. Both technologies are anticipated to augment or replace the legacy processes in the future. The tool allows variation of the timing and capacity of the investments in new technologies, capacity upgrades, and the future facility.

### Source Material

The tool includes options for new source material. The preferred plan is to convert new material from existing feedstock. The tool allows variation in the timing and scope of this plan, as well as two procurement options that could be used as near-term stop-gap measures.

### Tool Output

The key output of the tool is a graphical comparison of demand to production capacity for radiation cases. Additional details show demand and capacity for wrought and direct cast forming.